

Abstract

Method of Determining Structural Data of Prototypes for a Lightweight
Technical Structure, Practice of the Method and Prototype Produced by the

5 Method.

It has been known for constructing lightweight technical structures initially to
fabricate a prototype and thereafter to optimize it. To do so, either a physical
model is produced the data of which are copied and anchored in a numeric
10 prototype, or a numeric prototype is produced directly by means of structural
considerations and methods. In either case, the gathering of data for the
prototype is complex and as a rule does not yield a result which can be
optimized in a simple manner. The object of providing a method of efficiently
obtaining data for designing a prototype which can be optimized in a simple
15 manner is accomplished in accordance with the invention by selecting shell
architectures of natural bio-mineralized unicellular organisms in accordance
with an aspect set very closely adapted to the lightweight structure to be
produced and by directly copying their structural data. In this context, sub-
groups may also be selected. Partial solutions found are combined, the data
20 are scaled to the prototype which is scaled in a simple step. Prototypes of a
lightweight rim, a lightweight building material or a permeable lightweight shell
can be produced by preselecting diatoms or radiolaria.